BRISTOL 2 LTR & 2·2 LTR CARBURETTER JETTING (SOLEX CARBS)

ENGINE TYPE NO	85C	100A		100B		100B2		100C		100D		100D2		110	
		FAR	C	FAR	C	FAR	C	FAR	C	FAR	C	FAR	C	FAR	C.
CARB TYPE	32B1	32B1		32B1		32B1		32PB1-6		32PB1-6		32PB1-6		32PB1-7	
CHOKE SIZE mm	24	26		26		26		28		28		28		26	
MAIN JET	110	115	120	115	115	115	120	125	125	125	125	125	125	105	105
AIR CORRECTION	230	190	190	200	200	190	190	190	190	190	190	190	190	170	170
PILOT JET	50	45	45	45	45	45	45	55	55	55	55	55	55	50	50
AIR JET	1·5	1·2	1·0	1·0	1·0	1·2	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
GA STARTER JET AIR	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
GS STARTER JET PETROL	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
EMULSION TUBE	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
NEEDLE VALVE	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5	1·5
FLOAT SETTING															
NEEDLE VALVE WASHER														1mm	1mm
ACCELERATOR PUMP JET														60	90

SECTION 3

FUEL SYSTEM

CONTENTS

S E R V I C E   B U L L E T I N

R E C O R D   S H E E T

No.	Subject	Date	Signature

F U E L S Y S T E M

DESCRIPTION

A rigid pipe from the tank outlet is connected to a two-way adapter bolted on the inside of the upswept portion at the rear of the left-hand chassis member. From this adapter the main fuel pipe passes forward along the inside of the chassis side member, to which it is supported at intervals in spring "U" clips. The front end of the pipe is connected to a union on the petrol cock which is rigidly secured to the engine steady bracket. A flexible pipe links the petrol cock to the inlet side of the petrol pump, delivery being taken to the carburettors through a single-piece rigid "gallery" pipe. Banjo-type unions which incorporate gauze filters connect the gallery pipe to the three carburettors.

GENERAL DATA

Petrol reserve warning light... ...	...With the ignition switched on, this light (blue) appears when only 2 gallons remain in the tank.
Petrol pump	
Type	...A.C. type UG.
Pressure..	...1½ p.s.i. to 2½ p.s.i. (105 gr.cm^2. to 175·8 gr.cm^2.)
Location..	...Left-hand side of engine.
Petrol pipe lines	
Rigid pipes	...Copper piping 5/16in. bore.
Carburettors (downdraught)	...3 carburettors type Solex 32 B.I.

Settings

Choke	28.
Main jet..	135.
Correction jet..	240.
Pilot jet.	50DD.
Air bleed.	1·0.
Starter jet (air)	2·0.
Starter jet (petrol)..	95.
Emulsion tube...	Special. L24
Needle valve (float)..	1·5.

Air cleaner.. ... ... Vokes dry type.

SERVICING

No attention to the tank or petrol pipes is necessary under normal conditions.

Every 6,000 miles (10,000 km.)

Remove and clean the petrol pump cover and filter. Remove and clean the thimble filters in the gallery pipe banjos.

Note:- Clean the pump cover and filter at an earlier stage should sediment be observed in the cover. Do not use more than finger and thumb pressure to tighten the stirrup clamp nut over the filter cover.

It is advisable to use the cork gasket once only since any leakage at this point will prevent the pump drawing fuel from the tank. The symptoms of such air leakages are very similar to those for choked jets and often lead to

unnecessary dismantling of the carburettors.

Caution :- Turn off the petrol cock whenever the flexible pipe to the petrol pump is disconnected or petrol may be syphoned from the tank.

REMOVING AND REFITTING MAIN PETROL PIPE

It is unnecessary to drain the tank provided that the following sequence of operations is adopted.

1. Disconnect the main petrol pipe from the adapter on the upswept portion at the rear of the left-hand chassis side member.
2. Disconnect the front end of the pipe from the rear union of the petrol cock on the engine steady bracket.
3. Push upward on the pipe on both sides of each "U" clip along the inside of the chassis side member. When clear of the clips, remove the pipe.
4. To refit, reverse the above operations then prime the system by operating the petrol pump hand priming lever.

CHECKING PETROL TANK FLOAT UNIT

With the unit removed from the tank, check as follows :-

1. Shake the float to check that it is not punctured. Any fuel in it will be heard.
2. Make sure that the arm is soldered securely to the float.
3. Connect the electrical connections and secure a good earth wire between the flange of the unit and any convenient metal part of the tank compartment, ensuring that the acutal contact of the connections are free from paint, etc.

Warning :- Do not use a connection point near the float unit mounting flange of the tank, in case a spark occurs and ignites the petrol vapour.

4. Turn on the ignition switch and, holding the float unit steady, move the arm slowly through the complete arc of its travel and observe the reaction of the indicating dial on the instrument panel. Note also that the "low level" warning light operates satisfactorily.

The needle of the gauge dial should move steadily; if it jumps or moves erratically, re-check the electrical connections. If no improvement can be achieved, fit a new unit.

PETROL PUMP

Maintenance

No attention is normally required other than that quoted on page 6. If the pump is in very poor condition, it is advisable to replace the whole unit.

Removing

1. First turn off the petrol cock.
2. Disconnect both pipe lines, remove the two nuts securing the pump to the cylinder block and withdraw the pump.
3. Wash it thoroughly in petrol or paraffin and (if available) dry off with compressed air.

Refitting

1. Before refitting the pump, make sure that the joint faces on the cylinder block and the pump flange are clean.
2. Fit a new gasket Part No. N.370040.
3. Offer up the pump to its attachment face then fit both spring washers and nuts. Tighten evenly, a little at a time.

4. Connect both petrol pipes to their respective unions and prime the pump by means of the priming lever. Check for petrol leaks and rectify if necessary.

5. After the engine has been started and run for a short while, examine the pump flange joint for oil leaks.

Dismantling

1. Remove the six cheese-head screws holding the halves of the body together. The valves and seat assemblies are in the upper half, and the diaphragm and its attendant linkages in the lower half, see Fig. 1.

2. Release the filter cover retainer, remove the glass filter cover then lift off the filter and remove and discard the cork filter gasket.

3. Each valve and seat assembly is a complete unit. Remove each from the body upper half by unscrewing the two small countersunk screws and removing the valve retainer. Do not attempt to dismantle these units; they are supplied as complete assemblies.

4. Remove the diaphragm as follows. Ease the diaphragm from the lower half of the body with a knife, then press down firmly on the steel centre plate and twist (either way) through 90°. This will release the grooved tongue of the diaphragm stalk from the slot in the operating link, when the complete diaphragm assembly can be removed.

5. Beneath the diaphragm are two springs; the larger controls the petrol pressure feed to the carburettors and the smaller holds the oil seal in place, see Fig. 1. Remove the springs and seal which consists of a fabric washer and a cup-shaped seal retainer.

6. Remove the rocker arm screw at the bottom of the body lower half, extract the wire circlip from one end of the rocker arm pivot pin then, holding the rocker arm firmly, push out the pin with a suitable punch. The rocker arm will be forced out by a spring located between an upward extension of the arm and the body. Withdraw the diaphragm operating link.

The priming lever is riveted in position on the body lower half and should not be disturbed unless it is broken.

Inspection

Check each valve and seat assembly for operation and leakage. Ensure that

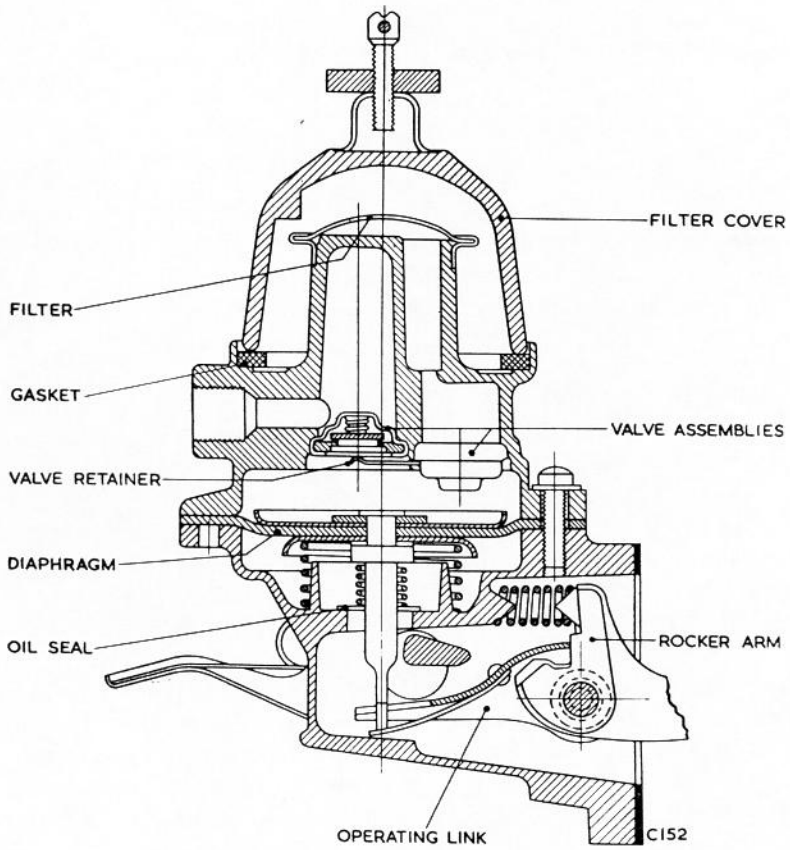

Fig. 1 Petrol pump.

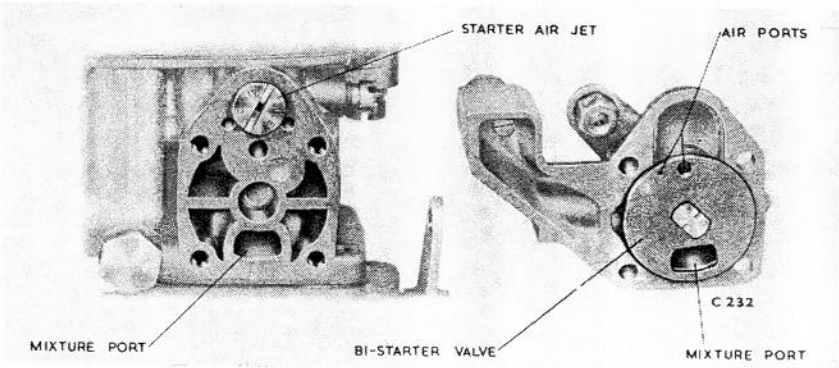

Fig. 2 Bi-starter assembly.

each valve is returned to its seat by the light spring beneath it. If the diaphragm fabric shows any evidence of fraying, blistering or perishing, replace it by a new diaphragm assembly.

Make certain that the oil seal and its spring are in good condition. This is important to prevent oil from being blown up on the underside of the diaphragm and is a safeguard against fuel entering the engine sump should the diaphragm become defective.

Examine the cam contact face of the rocker arm for undue wear. If the arm is worn concave, fit a new one. Examine the diaphragm spring for distortion or undue corrosion. If doubtful, renew it. The correct spring is marked with RED paint.

Re-assembling

1. Start with the lower half of the pump. Insert the rocker arm into the diaphragm operating link, place the spring over its location on the extension of the arm and carefully insert the whole assembly into the pump body until the pivot pin can be pushed through. Check that both link and rocker arm are free and that the spring is positioned correctly over both its locations. Refit the wire circlip over the end of the pivot pin.

2. Place the oil seal washer and cup in position and fit the diaphragm control spring. Fit the oil seal spring over the diaphragm stalk then push the diaphragm assembly down carefully into the body lower half until the stalk is felt to pass through the slot in the operating link. Twist the diaphragm assembly through 90° (either way) so that the two are locked together. Put this assembly to one side.

3. With the upper half of the pump inverted, fit a new valve gasket, followed by the two valve assemblies, THE CORRECT WAY UP, see Fig. 1. Fit the valve retainer and secure with its two countersunk head screws.

4. Hold the lower half of the pump body with one hand and position the rocker arm with a finger so that the diaphragm lies flat and level against the arm. Place the upper half on top, with the inlet and outlet in the correct relative positions to the lower half.

5. Holding the rocker arm firmly so that the diaphragm is not deflected, fit the securing screws and screw them down until the diaphragm is just gripped evenly all round. This is important. Operate the rocker arm gently 3 or 4 times, then tighten the six screws securely. Replace the rocker arm stop screw. It is important to fit the diaphragm carefully otherwise its life will be greatly reduced.

6. Refit the glass filter cover, using a new gasket. Do not use leverage other than the finger and thumb to tighten the retainer.

CARBURETTORS

Description

General

The three down-draught carburettors are bolted to the induction passage flanges of the cylinder head, the control shaft fulcrum brackets being interposed between the two outer carburettors and the head. An adaptor is fitted between the centre carburettor and the head. The control shaft has three arms each connected by a control rod to the throttle lever on a carburettor. Each control rod has a spring-loaded adjuster at the control shaft end, permitting precise adjustment of the throttle concerned, thus facilitating synchronisation. The control shaft is connected by a rod to a lever on a second control shaft situated at the rear of the bulkhead; this is operated by the accelerator pedal. All three carburettors are identical, see General Data. Each carburettor incorporates a Solex Bi-starter, the starter controls being interconnected and controlled in unison by a knob on the dashboard, marked "M".

Each stage of carburation (i.e. starting, slow running and running) has its own petrol jet and air jet; this enables mixture corrections to be made to any

one "stage" without disturbing the other two, but each stage must be "blended" into the next by final adjustment.

The three sections of the main carburettor are bolted together and comprise :-

1. The top, consisting of the float chamber cover containing the needle valve assembly, the intake extension and Bi-starter air ducts.

2. The centre which contains the choke tube, air and petrol jets and the float chamber.

3. The base which is the throttle valve chamber and contains the volume control screw for slow running, as well as the starter delivery ducts.

Bi-starter

The Bi-starter housing is secured to the left-hand side of the carburettor body. The assembly is illustrated in Fig. 2 and shown diagrammatically in Fig. 3. A semi-rotary plate valve and a disc are located on a spindle mounted in the chamber formed between the housing and the carburettor body, the spindle being operated by a lever. A spring fitted between the valve and disc holds the valve against its seating on the body, and a spring-loaded ball locates the valve in its intermediate setting by engaging an "indent" on the periphery of the disc.

The control knob on the dashboard actuates an enclosed push/pull wire connected to No. 2 (centre) carburettor, a coupling bar linking this carburettor with the other two carburettors. There are three distinct positions of the control, i.e.

Full out ..... Full rich for cold starting.

Intermediate ..... Initial warming-up period to enable driving off on a cold engine.

Full in ..... Bi-starter out of action.

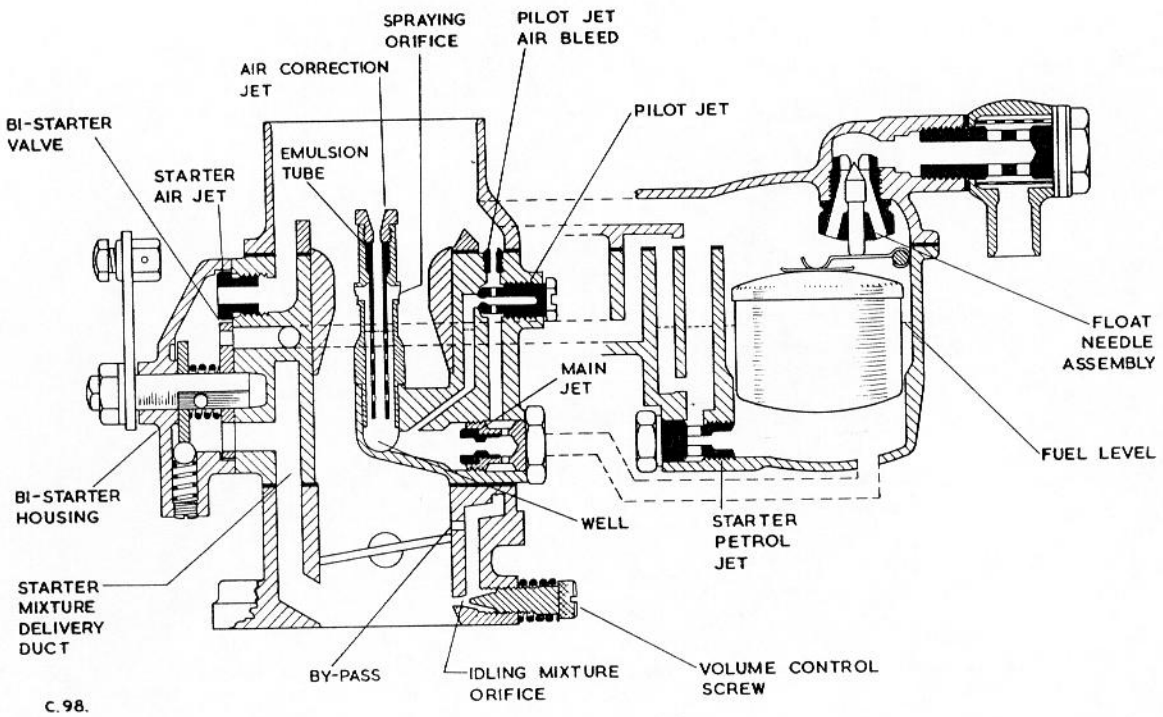

Fig. 3 Diagram of carburettor.

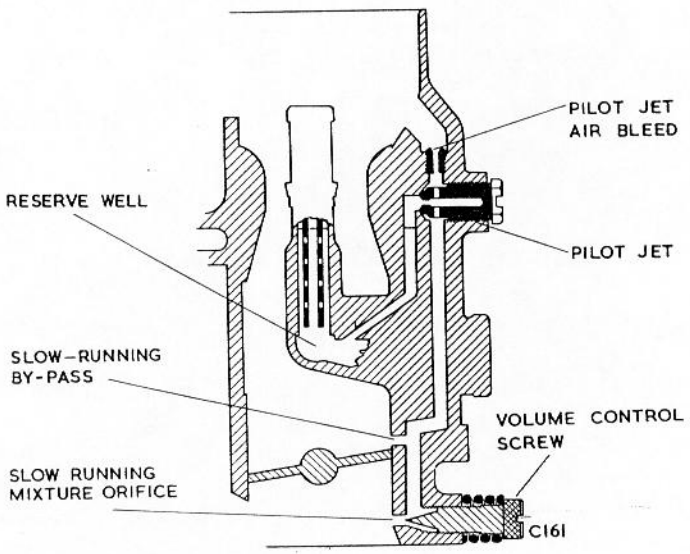

Fig.4 Diagram of slow-running system.

The valve has two adjacent ports, one large and one small, while diametrally opposite is a radial slot, see Fig. 2. When the valve is turned to the "cold starting" position, the larger port at the top registers with the petrol delivery port in the carburettor body, and permits the full output of petrol from the starter petrol jet to enter the Bi-starter chamber. This jet is situated at the base of the float chamber, adjacent to the Bi-starter assembly. When the valve is turned to the intermediate position, its smaller port registers with the petrol delivery port and restricts the flow of petrol from the jet. The correct volume of air for both valve positions is controlled by the starter jet; the air enters the chamber and the resultant petrol/air mixture passes through the radial slot in the valve to the starter mixture delivery duct, and enters the induction system below the carburettor throttle butterfly, see Fig.3. It is thus imperative for the correct functioning of the Bi-starter that the throttle is fully closed otherwise the necessary depression in the Bi-starter will not be obtained. The richest mixture is required only for the initial start and this is supplied by the Bi-starter. When the engine has fired and "picked-up", the starter well becomes empty and the supply is then restricted to the output of the starter petrol jet. At the same time, with the increase in r.p.m., a larger volume of air is inspired by the starter air jet thereby weakening the mixture to its correct proportions and counteracting any tendency to overdose the engine cylinders.

Slow-running system

The slow-running petrol supply is effected as follows :-

Referring to Fig.4, petrol is drawn from the well through the vertical channel in the choke housing leading to the pilot jet which meters the petrol drawn into the air stream entering the pilot jet air bleed above it. The

petrol/air mixture then passes downwards to emerge into the main induction tract through the slow-running mixture orifice below the throttle butterfly.

The effective area of the slow-running mixture orifice is controlled by the spring-loaded volume control screw; the slow-running of the engine is thus controlled without disturbing the succeeding mixture range. Turn the volume control screw IN (clockwise) to weaken and OUT (anti-clockwise) to richen the mixture.

When the throttle is closed to the slow-running position, the slow-running by-pass is on the atmospheric side of the butterfly and therefore is not subject to induction depression. Under these conditions, air enters the by-pass and further emulsifies the mixture. When the throttle is opened wider, the by-pass becomes subject to induction depression and its function changes, the by-pass now acting as a delivery orifice in addition to the slow-running mixture orifice, thus preventing a flat spot which might otherwise intrude.

Main throttle range

For the main throttle range control, the choke tube size should not be altered except for specialised requirements, and then only after consultation with the Car Division of the Company.

The sequence of operation in this range is as follows :-

Referring to Fig.3, when the engine has been started and the throttle opened beyond the slow-running range, air is drawn through the choke tube venturi. The depression in the venturi draws petrol from the spraying assembly through the spraying orifices and the resultant mixture passes to the induction system.

As the throttle is opened further, the depression at the choke tube venturi increases, lowering the level of petrol in the spraying assembly until the upper

holes in the emulsion tube are uncovered. Air is now drawn down the emulsion tube through the air correction jet, emerges from the upper holes and passes up the outside of the emulsion tube to emerge through the spraying orifice, thus maintaining the correct petrol/air ratio.

Progressive opening of the throttle increases the depression in the choke and more petrol is drawn from the well, but as the petrol level in and around the emulsion tube is lowered, the emulsion tube holes are uncovered progressively, permitting more air to enter and balance the mixture to its correct proportions. When the well is empty, the fuel supply is governed by the main jet alone. Fig. 3 indicates that the air will discharge through the emulsion tube at right angles to the upward flow of petrol from below, thus offering resistance to the output of petrol from the well.

Servicing

Little or no attention to the carburettors is required except for periodically cleaning the tubular gauze filters inside each petrol feed banjo union to the float chambers, and lubrication of control linkages. Never use wire to clear choked jets; clean them only with compressed air. Adjustments to mixture may be found necessary as conditions (barometric) vary, e.g. high altitude or climatic conditions; instructions for such adjustments are given under "Tuning and Synchronisation" on page 23.

Removing

The following is the sequence of operations for removing the carburettors from the engine.

1. Loosen the hose clips securing the three Vokes air filters to the carburettors, then remove the filter units and clips.

2. Detach the petrol pipe assembly from the three float chambers, ensuring that the gauze thimble filters and the fibre washers from the banjo bolts are not lost.

3. Disconnect the throttle control rods from each lever on the control shaft by removing the locknut and retaining nut. Replace the nuts after removal for safe keeping.

4. Disconnect the Bi-starter control wire and clip from No.2 carburettor and remove the tie rod from all three carburettors.

5. Mark each carburettor so that it can be refitted to its correct flange. Remove the six flange nuts and spring washers, and lift the ignition H.T. leads and bracket from between No.1 and No.2 carburettors.

6. Lift off each carburettor together with its throttle linkage.

Refitting

Before refitting, check that all flanges are clean and flat; make sure that the filters in the gallery pipe banjo bolts are clean, then proceed as follows :-

1. Fit a new gasket (Part No. N.373320.) to each flange.

2. Refit each carburettor to its correct position with the throttle control rods lying <u>above</u> the control shaft. Place the ignition H.T. lead bracket in position between No.1 and No.2 flanges before fitting and tightening the flange nuts.

3. Refit the Bi-starter tie rod and fit the control wire to No.2 carburettor. Adjust the wire so that the levers are against their stops before the dashboard knob is seating.

4. Connect the throttle control rods to each lever on the control shaft.

5. Connect the fuel pipe assembly to the three float chambers. Ensure that the fibre washers are in good condition, and that the gauze filters are in place.

6. Refit the three Vokes filters and secure by tightening the hose clips.

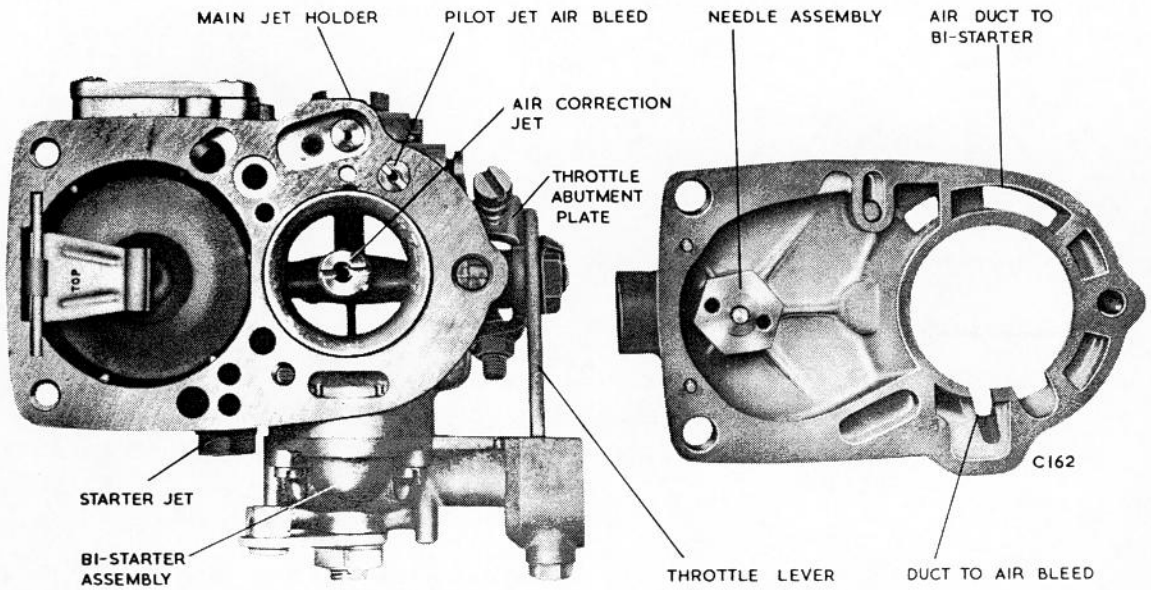

Fig.5 Jet and float chamber arrangement.

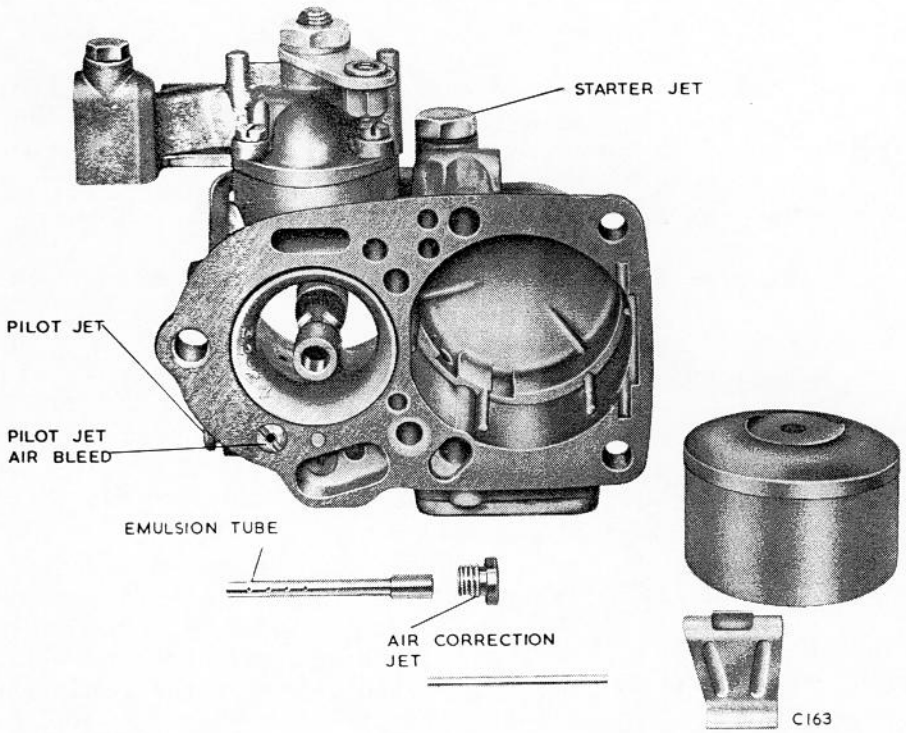

Fig.6 Float mechanism and emulsion tube.

7. Check the synchronisation of the throttle as described on page 23. This is essential.

Dismantling

It is advisable to discard the gaskets removed during dismantling; only in an emergency should the old ones be refitted and then only after prolonged soaking in thin oil. The necessary gaskets are as follows :-

Float chamber cover gasket,	Solex Part No. 52878	(1 per carburettor).
Throttle chamber gasket,	Solex Part No. 52788	(1 per carburettor).
Flange gasket,	Solex Part No. 7700	(1 per carburettor).

The following procedure is applicable to all three carburettors.

1. Remove the float chamber retaining screws and lift off the cover, see Fig. 5; remove the gasket. Unscrew and remove the needle valve assembly, if necessary.

2. Lift out the float toggle, spindle and float. Take care not to lose the toggle fulcrum pin.

3. Unscrew the air correction jet see Fig. 6; if necessary, extract the emulsion tube beneath it by wedging a match-stick into the top; if it is too tight, invert the carburettor and tap gently.

4. Unscrew the pilot jet air bleed and the pilot jet.

5. Remove the main jet holder and from it unscrew the main jet.

6. Remove the starter jet from the base of the float chamber adjacent to the Bi-starter assembly.

7. Remove the four cheese-head screws securing the Bi-starter assembly, and remove the assembly; no gasket is fitted. If it is desired to remove the choke tube, first loosen the locating screw and push out the choke.

8. Remove the starter air jet from the Bi-starter attachment face.

9. Part the throttle chamber from the float chamber assembly, see Fig. 7, by inverting the carburettor and removing the four cheese-head screws. If the two sections will not fall apart, lever gently between the bottom of the float chamber and the throttle spindle boss. Never tap the flange with a hammer.

10. Remove and discard the gasket.

11. Remove the volume control screw and its spring.

Inspection

When inspecting the carburettors after dismantling, the fit of the butterfly spindle in its bearing is very important. If the spindle is excessively slack, the butterfly will cause an indentation in the throttle housing bore, thereby destroying the correct function of the idling mixture and by-pass orifices and ultimately affecting the whole carburation range. If this has occurred, it is advisable to fit replacement carburettors.

Closely examine the volume control screws; reject any screw with the point bent or scored.

Re-assembling

The assembly procedure is as follows :-

1. Lightly oil the threads then refit the volume control screw and spring.

2. Assemble the throttle chamber to the float chamber assembly, using a new gasket, and secure with its four cheese-head screws. The gasket can be fitted either way round. Insert the choke tube (if it has been removed) with the numbered end to the top of the assembly and tighten the locating screw.

   Caution :- It is possible to fit the choke the wrong way up; if this is done, the venturi will be misplaced in relation to the spraying assembly and the carburettor will not function correctly.

3. Refit the starter jet (marked Solex starter) in the threaded hole at the base of the float chamber adjacent to the Bi-starter location.

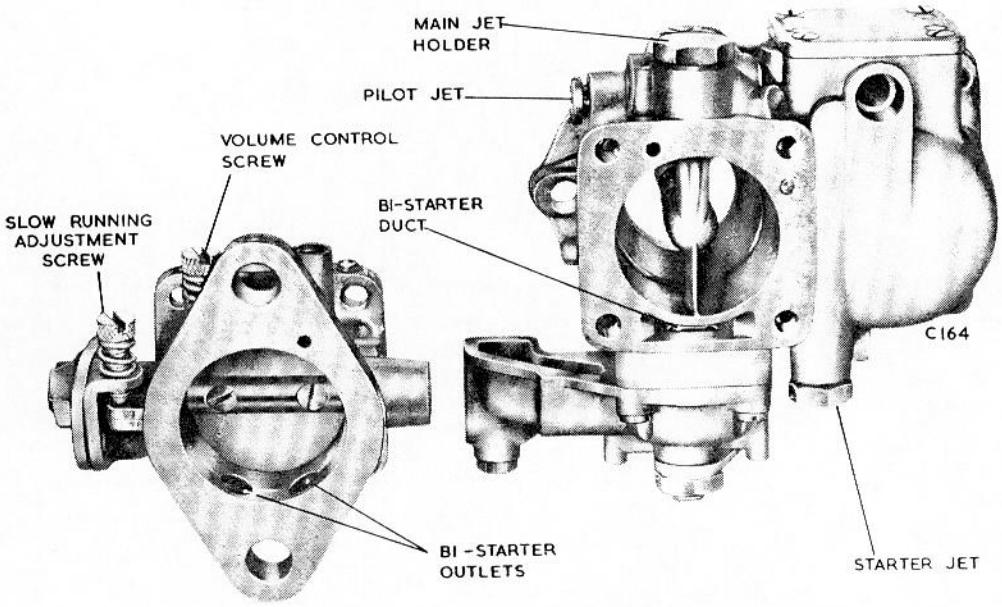

Fig.7 Throttle and float chamber assemblies.

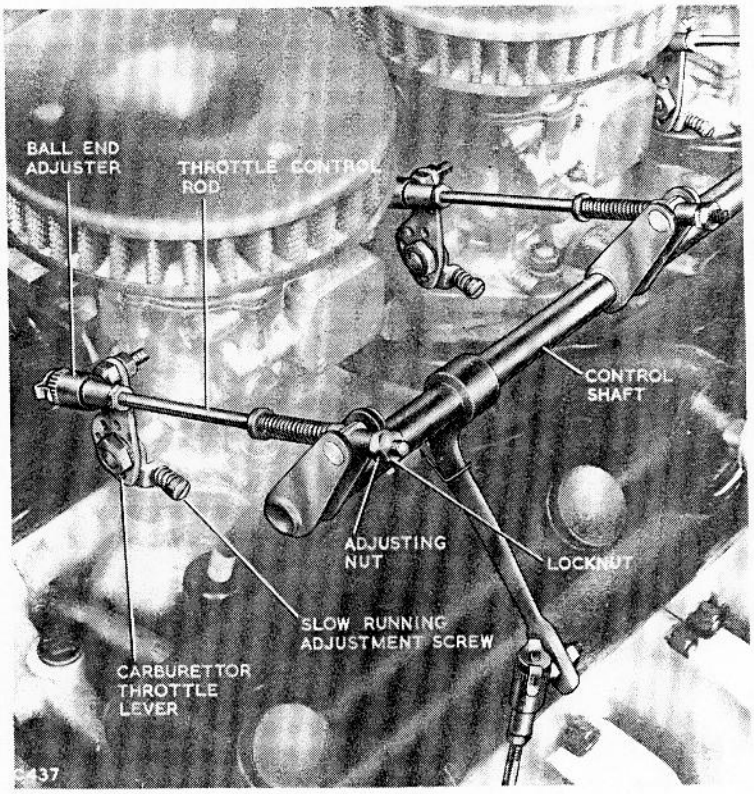

Fig.8 Throttle control adjustments.

4. Refit the starter air jet (marked Solex Air 2).

5. Refit the Bi-starter assembly; no gasket is fitted. If a new disc valve is required, the valve assembly is supplied only as an integral unit. Ensure that it is inserted in the housing the correct way up, i.e. with the slot to the bottom and the lever facing upwards, see Fig. 2.

6. Refit the main jet to its holder (marked Main jet holder) and refit to the carburettor.

7. Refit the pilot air bleed.

8. Refit the pilot jet. It is most important to ensure that the inner end seats before the head abuts the housing. If it does not, relieve the casting by careful filing to provide a clearance between the head and housing as shown in Fig. 7.

9. Insert the emulsion tube into the spraying well and refit the air correction jet above it.

10. Replace the float; it will only fit correctly one way.

11. Fit the spindle to the float toggle and place in position in its location slots; one side of the toggle is marked "TOP".

12. Check that the fibre washer is in good condition then fit the needle valve assembly to the float chamber cover. If the washer is defective, replace only by the correct washer, Part No. 2261.

13. Fit the new float chamber gasket dry and replace the float chamber cover, ensuring that the two small dowel pegs enter their location holes correctly and that the cover is "settled" into position before tightening the three slotted hexagon-head screws.

14. Set each slow-running adjustment screw until the screw just touches its stop and then turn in 1 turn further.

15. Set each throttle to the full open position, then set the stop screw to abut its stop with the throttle parallel with the choke axis; when set, tighten the stop screw locknut.

CARBURETTOR TUNING AND SYNCHRONISATION

General

Refitment of the carburettors may alter the carburettor position relative to the control shaft. For this reason it is most important to check the

synchronisation of the throttles. Check also that the Bi-starter control lever on each carburettor is against its fully closed stop before the control knob "M" abuts the instrument panel. Any adjustment made to one carburettor must also be made on the other two. It cannot be emphasized too strongly that it is useless to attempt to adjust and synchronise multiple carburettors unless other adjustments are perfect, i.e. the tappets set correctly and the contact breaker points clean, dry and set to their correct gap; the sparking plugs must also be in good order, clean and the gaps set correctly.

In the normal course of events the choke tubes, petrol and air jets should not be altered unless the car is to travel in different barometric conditions or a different quality fuel is used.

Caution:- Some grades of fuel produce a hard crust-like deposit in the carburettors; remove this from time to time, and keep the petrol filters in good condition.

Note:- With increase in altitude, the carburettor mixture becomes richer. In theory, this amounts to a 17½% increase in mixture strength for every 6,000 ft. altitude gained. Varying qualities of fuel must also be taken into account. In practice, and as a guide, it may be taken that the standard setting of jets remains effective up to 3,000 ft.; thereafter, for every additional 3,000 ft. of altitude, a main jet one size smaller may be used with a possible corresponding increase in the size of the air correction jet. Loss of power is inevitable as altitude is increased; this cannot be regained by carburettor adjustment.

The following sequence is given as a guide to the correct selection of jets, etc.

Starting

1. If the engine does not start almost immediately when it is cold and the Bi-starter control is fully OUT (full rich), alter the

petrol starter jets only. Do not alter the air jets inside the Bi-starter assemblies since these jet sizes are determined on a cylinder capacity basis.

2. Should the starting mixture suddenly appear excessively rich, check that the starter air jet on one or more carburettors (or the two small holes on either side of it) are not obstructed.

3. Never use the full rich position to start a warm engine. If the engine will not start with the Bi-starter control in the off (IN) position, use the intermediate position, which can be felt by the "click" of the spring-loaded ball in the assembly.

Slow-running

The essential feature of the slow-running speed setting is to obtain exact synchronisation of the three throttles. Two methods of setting the slow-running are given below, method "A" being recommended when specialised equipment is not available, and method "B" which is that employed by the Company. With both methods, refer to Fig.8.

Method "A"

1. Disconnect the spring-loaded ends of the three control rods from the control shaft and check that there is no backlash at the ball-joint ends on the carburettor throttle levers. If there is backlash, tighten the adjustments fully then loosen one "click". Check that there is at least $\frac{1}{8}$in. clearance between the manually operated throttle control lever and its point of contact with the accelerator control arm when the control knob "T" is fully in.

2. Remove the air filters then check that each throttle butterfly is fully open when its lever is against its fully open stop.

3. Close each throttle in turn by finger-pressure and screw back each slow-running adjustment screw until it is just clear of its abutment then, with a strip of thin paper inserted between the screw and its abutment, turn in the screws until the paper is just nipped. Then turn each screw IN one complete turn.

Note :- Do not use feeler gauges for this purpose since on used carburettors, the slow-running screws may have caused indents on their respective abutments to a varying degree.

4. Insert No.3 control rod into its pivot pin on the control shaft lever and, with the accelerator pressed lightly to the floor, screw the adjusting nut on to the control rod until it just abuts the pivot pin; at this setting, the spring should just be nipped. Fit the locknut to the control rod, but do not tighten at this stage.

5. With the accelerator pressed hard down to the floor, check that when the throttle (No.3) is against its fully open stop, the spring on its control rod is compressed sufficient only to relieve the load on the adjusting nut. Release the accelerator.

6. Connect No.2 control rod to the layshaft and, with a strip of paper between the spring-loaded slow-running adjustment screw and its abutment, tighten the control rod adjusting nut until the paper strip is just nipped. Fit the locknut but do not tighten at this stage.

7. Repeat para. 6 on No.1 carburettor.

8. Open the throttles fully by means of the control shaft lever and check that each throttle is against its respective stop at the same moment. Check also that when the accelerator is pressed hard to the floor, each spring at the control rod adjustment is compressed to the same extent, i.e. just relieving the load on the nuts.

9. With a strip of thin paper (4in. x 3/16in. wide) trapped between each slow-running adjustment screw and its abutment, open the throttles by the manual control (pull out knob "T" on instrument panel) to an extent where the 3 strips of paper can be withdrawn with the same "feel" of resistance. If any one strip of paper is gripped more tightly than its neighbour, adjust only on the adjustment nut of the relevant control rod. When all three are satisfactory, secure the control rod adjusting nuts with the locknuts, and re-check. The throttles are now synchronised.

10. Turn each volume control screw right home (do not use force or the seatings will be damaged) and then turn each back 1 turn.

11. Start up the engine and adjust the manual throttle control to give approximately 1,000 r.p.m. and run at this setting until 70°C. water temperature is reached.

Note :- If the slow-running mixture is obviously wrong after the Bi-starter control has been pushed fully home, adjust the volume control screws by equal increments as necessary. A weak mixture is indicated by a tendency to stall after erratic running; an overrich mixture causes "hunting", a strong smelling exhaust, and the engine rocking violently in its mountings. Turn the volume control screws IN (clockwise) to weaken and OUT anti-clockwise) to richen the mixture.

12. When the water temperature has reached 70°C., push home the throttle knob on the dashboard and adjust each slow-running adjustment screw by equal amounts one way or the other as necessary to give an idling speed of 750 to 800 r.p.m. Then adjust each volume control screw by equal amounts until smooth idling is achieved within this range of r.p.m. The exact idling speed obtainable is dependent on the general condition of the engine, e.g. presence of carbon, etc.

Caution :- Never adjust the slow-running adjustment screw and the volume control screw on one carburettor at a time, but adjust each slow-running adjustment screw in turn and then each volume control screw in turn.

Once the throttles have been synchronised, there is no need to disturb the linkages. For normal adjustment to the slow-running, merely re-set the three slow-running adjustment and the three volume control screws.

Method "B"

The panel illustrated in Figs. 9 to 12 provides a visual indication which enables accurate carburettor synchronisation to be obtained; it can be made locally to the dimensions shown in the illustrations.

The panel carries three "U" tubes on its front face, the scale at the side of each tube being calibrated according to the specific gravity of the fluid employed in the tubes. Red-X is recommended for the purpose, and the scale readings quoted are obtained with this fluid. It should be noted, however, that the readings will also depend on the condition of the engine.

Behind the panel are a number of brackets to carry the necessary adapters, and master pilot jets, etc.

1. Remove the three Vokes air filters from the carburettors.

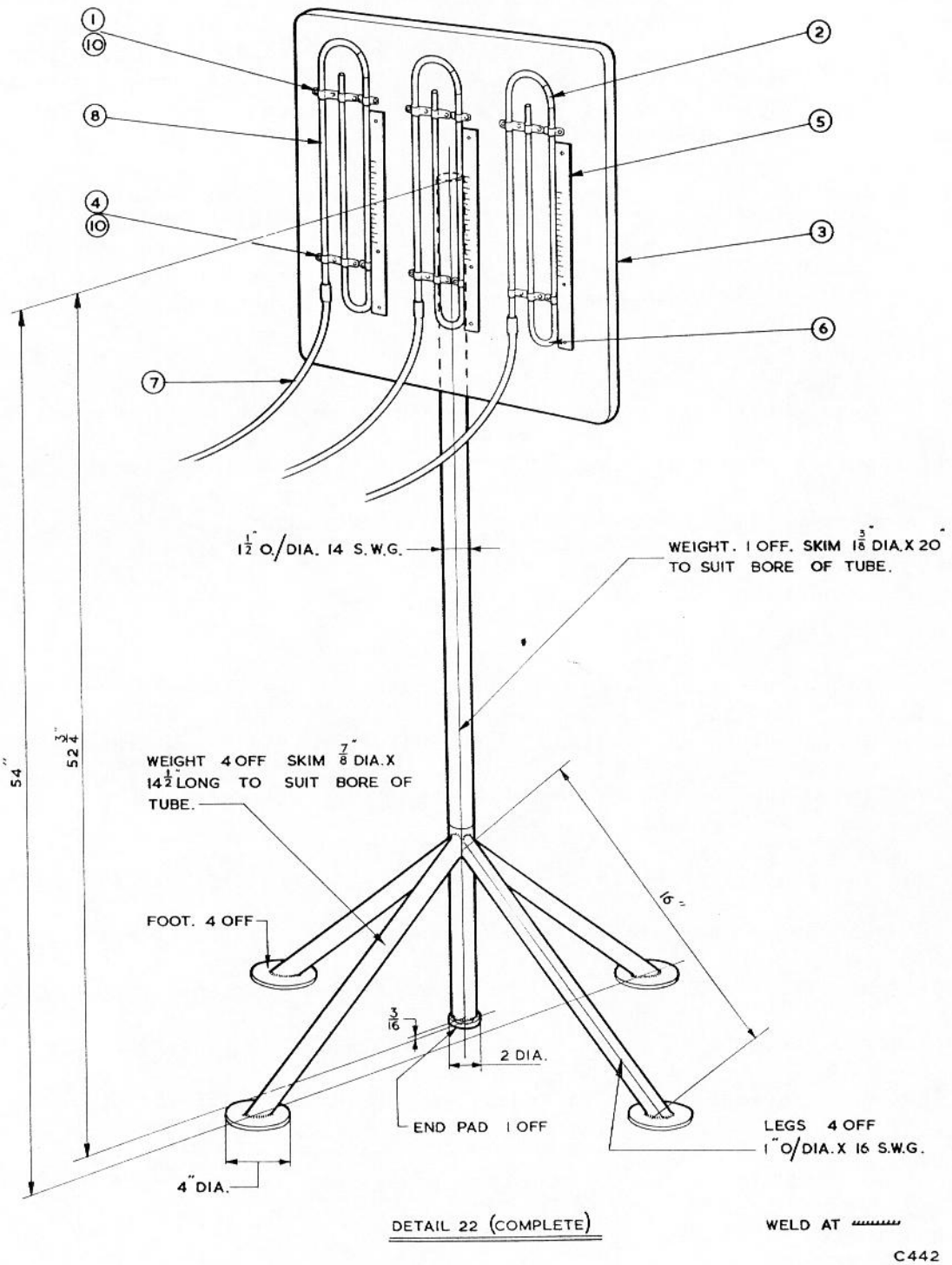

Fig. 9 Carburettor synchronisation panel.

	DESCRIPTION	No. OFF.	MATERIAL	REMARKS
1	CLIP	3	ALCLAD.	
2	SLEEVE	3	COM. RUBBER.	SIZE TO SUIT.
3	BOARD	1	PLYWOOD.	
4	CLIP	9	ALCLAD.	
5	SCALE	3	ALCLAD.	
6	U TUBE	3	GLASS.	5/16" O D X 1/4" BORE.
7	TUBE	3	COM. RUBBER.	6' LONG EACH.
8	TUBE	3	COPPER.	
9	WOODSCREW	62	M.S.	SIZE TO SUIT.
10	SLEEVE	12	COM. RUBBER.	SIZE TO SUIT.
11	CLIP	2	M.S.	
12	TUBE	1	M.S.	
13	TUBE	3	COPPER.	
14	UNION	3	STD. ROTHERAM.	1/4" GAS.
15	NUT	3	STD. ROTHERAM.	TO SUIT 1/4 GAS UNION.
16	NIPPLE	3	STD. ROTHERAM.	TO SUIT 5/16 O D TUBE.
17	COVER PLATE	3	ALCLAD.	
18	SCREW 2 B.A. 1/2" LONG	6	STANDARD.	CHEESE HEAD.
19	BLOCK	3	TUFNOL.	
20	JUBILEE CLIP	3	STANDARD.	SIZE TO SUIT.
21	CLIP	3	ALCLAD.	
22	STAND	1	M.S.	
23	NAME PLATE	1	ALCLAD.	
24	JET Nº 50.SLOW RUNNING	3		
25	SPARE JET POSITIONS			
26	SPARE JET POSITIONS			
27	BRACKET	3	ALCLAD.	
28	RUBBER SLEEVE	3	COM. RUBBER.	

C 442/1

Fig. 12 Carburettor synchronisation panel.

2. Working from the right-hand side of the engine, screw the volume control screws on all carburettors right home, then screw them out one complete turn.

Caution :- Do not force these screws home or the seatings may be damaged.

3. At the carburettor end of each of the three control rods, tighten the ball joint adjuster, then slacken it one notch. Check that there is at least $\frac{1}{8}$in. clearance between the manually-operated throttle control lever and its point of contact with the accelerator control arm when the control knob "T" is fully in.

4. Start the engine and run at about 1,000 r.p.m. until the water temperature is not less than 70°C. When this temperature has been reached, shut down the engine to about 800 r.p.m., if necessary, temporarily adjusting the slow-running adjusting screws.

Note :- During the process of tuning, the water temperature will probably rise; it is advisable therefore to ensure free entry of air to the radiator. Do not allow the water temperature to rise above 90°C.

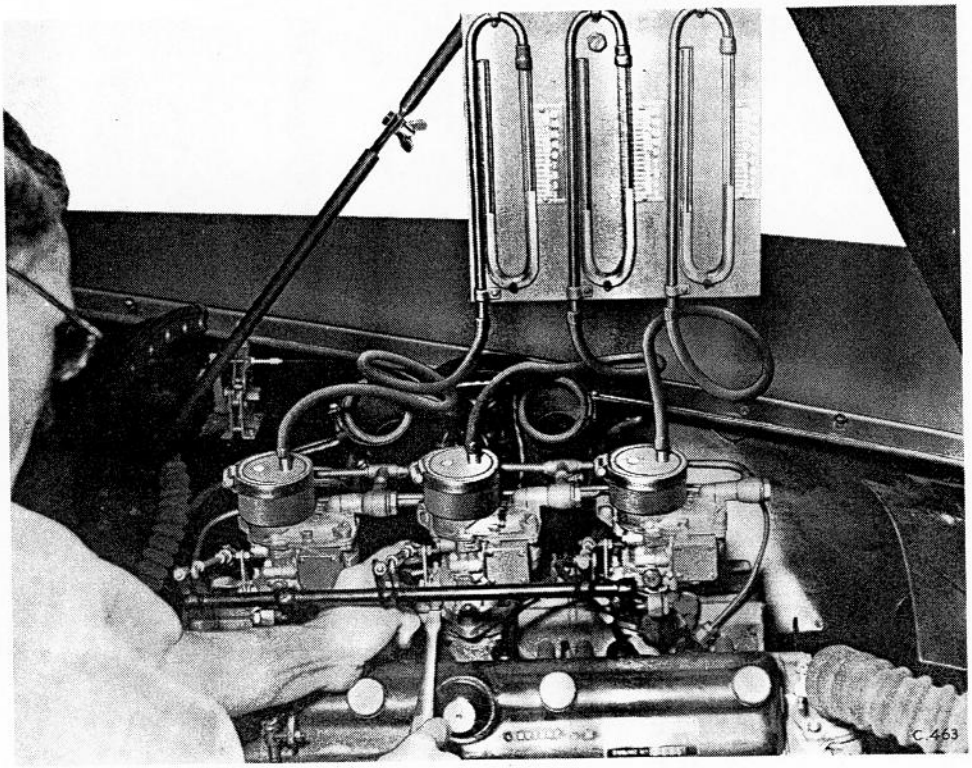

Fig. 13 Synchronising throttle with "U" tube panel.

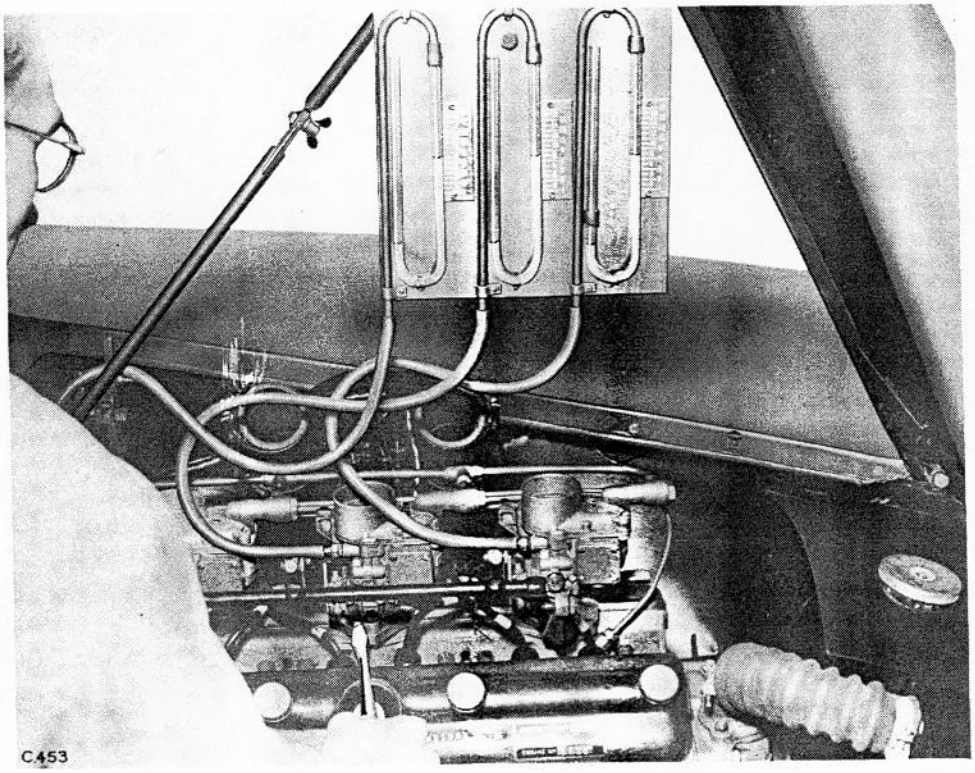

Fig. 14 Adjusting slow-running with "U" tube panel.

5. Fit the relevant adapter over each carburettor intake and connect each adapter to one of the "U" tubes with rubber piping.

6. Starting on the centre carburettor, apply finger-pressure to the end of the control rod ball joint and turn back the adjusting nut at the outer end just to release the load on the spring. Hold the throttle against its slow-running stop and, with a screwdriver, turn the slow-running adjustment screw of the carburettor as necessary until the level of fluid in the relevant "U" tube registers exactly with the second graduation mark of its scale. Still retaining finger-pressure on the control rod end, screw down the adjusting nut on the outer end of the rod until it abuts the pivot pin. Release the finger-pressure on the rod, but check that in doing so, the reading on the "U" tube does not alter; if it does, re-apply the finger-pressure and screw down the adjusting nut very slightly and re-check the reading on the "U" tube. When satisfactory, secure the adjusting nut with its locknut.

7. Repeat this process on the other two carburettors and check finally that the fluid in all three "U" tubes gives the same reading, i.e. exactly on the second graduation mark. The throttle settings on all three carburettors are now synchronised.

Note :- When screwing down the adjusting nuts on either of the two outer control rods, take great care not to overtighten them, since this will result in slight opening of one or both of the remaining throttles, and so upset true synchronisation as indicated on the scale readings.

8. Stop the engine, detach the piping then remove the adapters.

9. Remove the pilot jet from each carburettor, fit the kit master pilot jets and connect the rubber pipes from the "U" tubes to the master jets.

10. Start the engine. With the water temperature at not less than 70°C., and the engine slow-running, adjust the volume control screw of the centre carburettor until the level of fluid in the "U" tube registers exactly with the eighth mark on its scale. Repeat on the other two carburettors. The settings of the volume control screws on the three carburettors are now synchronised.

11. Stop the engine, remove the master pilot jets and refit the pilot jets.

12. Refit the adapters to the carburettor air intakes and re-check the throttle settings as given in paragraph 6. If necessary, re-adjust the throttle synchronisation.

This setting should produce an idling speed of approximately 800 r.p.m. dependent on the general condition of the engine. If the engine has been run-in correctly and is in good condition, it should be possible to obtain a slow-running speed of 750 r.p.m. if required. If, however, the slow-running speed is too high, adjust each slow-running adjusting screw by equal increments as required, then repeat the throttle synchronisation check described previously. Should the scale reading drop below two graduations to obtain the desired idling speed, 8 graduations must be retained when using the master pilot jet. Any variation from this setting will either richen or weaken the mixture and upset normal running.

The synchronisation completed, remove all test equipment and refit the air filters.

Running

1. Open the throttles smartly and note that the engine responds without spitting back; consistent spitting indicates weakness in mixture. If this cannot be adjusted on the volume control screws, try a main jet one size larger.

2. The remainder of the throttle range should be checked on the road, preferably on a gradient which is well known. The fitment of a larger size main jet may upset the performance at wider throttle openings or consumption may be too great. In this case, try a size larger air correction jet. Fig.15 shows diagrammatically the sphere of influence of the main jet and air correction jet in relation to throttle position. It will be noted from the diagram that the petrol supply fed from below is represented by the total area below the heavy centre line, while the air supply fed from above is represented by the total area above the centre line. The shaded portions show respectively the influence of differing sizes of main jet and air correction jet. Thus a larger size main jet will increase the total area, i.e. the sum of the areas above and below the centre line, by adding to the petrol side (enrichment) at smaller throttle openings. At the wider throttle positions, the mixture is corrected on the air correction jet, and alters the total area on the air side of the diagram.

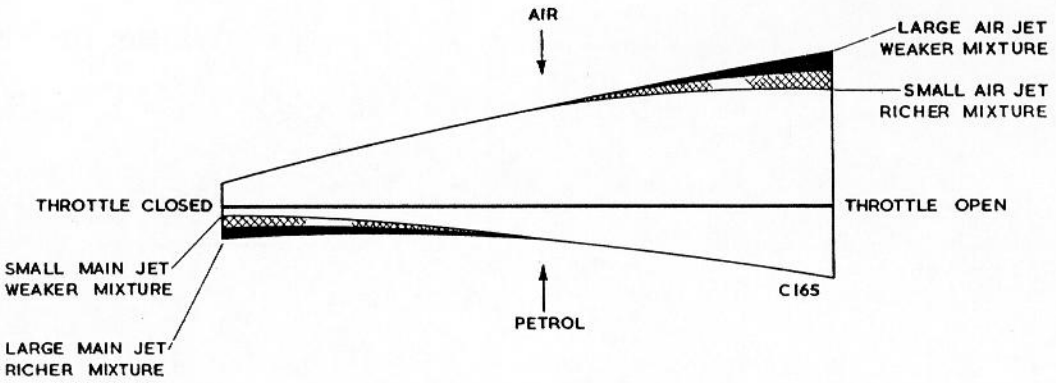

Fig. 15 Diagram of jet effect.

3. Each successive stage of carburation must "blend" into the next. Adjustment to the "top end" and "middle" is by selection of jets, but the extreme lower end (being adjustable) must be set to give a steady idling at 750 to 800 r.p.m. and at the same time enable the car to accelerate smoothly. Should hesitation with intermittent spitting back occur, turn each volume control screw OUT by increments of $\frac{1}{4}$ of a turn at a time until no hesitation occurs on "pick-up". However, if the engine runs unevenly at small throttle openings but with no "spit back", this can often be overcome by setting No. 1 and No. 3 volume control screws IN about $\frac{1}{2}$ a turn each, i.e. a slightly rich setting on No. 2.

AIR FILTERS

A "Vokes" dry fabric filter unit is fitted to each carburettor and is secured by a hose clip.

Each filter unit comprises a dry fabric element secured between the two halves of a sheet metal housing by three bolts. Distance pieces fitted on the bolts between the housing sections prevent collapse of the filter elements when the securing nuts are tightened.

Clean the filters every 10,000 miles as follows :-

Place the filter units upside down on a bench and release the three bolt securing nuts. Lift off the bottom half of the filter housing, then remove the filter element, leaving the bolts and distance pieces in position. Tap the element sharply to remove loose particles, then clear with an air blast.

Never use liquid of any kind to cleanse the elementsas this will result in choking the pores of the fabric.

Note :- A choked air filter will result in a general deterioration of performance and a drop in maximum power. This is due to the fact that the increased depression in the choke area is communicated to the float chamber by a balance duct which, while preventing an overrich mixture, cuts down the total volume of mixture fed to the engine.

FAULT DIAGNOSIS

If the carburettor performance should suddenly become faulty after satisfactory service, do not change air or petrol jets, even though changes may indicate or even effect a cure. This step only hides a fault.

In the following notes, it is assumed that the history of the carburettor or engine is unknown, and therefore where a change of a jet size is suggested, it must only be adopted as a last resort. Never fit "odd" size jets to multiple carburettors; they must all be the same in every respect unless specified otherwise by the manufacturers.

No firing -(Bi-starter in operation).	1. Petrol cock turned off. 2. Petrol tank empty. 3. Petrol pump diaphragm failure. 4. Air leak in petrol pump filter cover joint. 5. Petrol pump valves sticking. Note if there is any agitation of the petrol in the glass filter cover when the engine is turned over. 6. Air leak in the flexible pipe on the suction side of the pump.
Engine fires but will not run.	1. Restricted petrol pipes or gauge filters. 2. Choked starter jet in one or more carburettors. 3. Punctured petrol pump diaphragm.
No firing - (engine hot).	1. Residual vapour in the induction tracts. Remedy:- Switch on the ignition, open the throttles wide and press the starter button; as soon as the engine "picks-up", close throttles. 2. One or more carburettors flooding.
Firing and finally stopping.	1. No petrol on the main supply. 2. Petrol pump valves stuck. 3. Air leaks around the petrol pump filter cover. 4. One or more carburettors flooding.
Poor slow-running.	1. Volume control screws set incorrectly. 2. One or more pilot jets choked. 3. Drops of water behind one or more pilot jets; this causes intermittent or erratic slow-running. 4. Damaged seating behind one or more volume control screws. 5. Bi-starter controls not closing fully.
Flat spot on pick-up.	1. Slow-running by-pass choked in one or more throttle chambers. 2. Petrol level too low in one or more float chambers. Adjust by fitting the correct fibre washer beneath the float feed valve assembly.

Poor acceleration.	1. One or main jets choked. 2. Main jets too small. 3. Choke sizes too large. 4. Air leaks at flange joints.
Poor maximum speed.	1. Air leakage at the petrol pump filter cover joint. 2. Water in the petrol system. 3. Air vent to tank choked. 4. Air leaks at the carburettor flange joints. 5. Air correction jets too large (weak). 6. Air correction jets too small (rich). 7. Filter gauze in one or more float chamber unions choked. 8. Petrol pump cam lever worn. 9. Air filter choked. 10. Choke sizes too large.
Good performance but excessive consumption.	1. Petrol leak due to damaged pipe beneath the car (visible after standing). 2. Petrol leak on delivery side of pump, (visible only when the engine is running). 3. Main jet too large. 4. Air correction jet too small. 5. Bi-starter control not fully closed. 6. Volume control screws not synchronised, i.e. one or more adjusted too rich. 7. Slow-running adjustment wrongly set, or badly synchronised.